

Serial No. 09/886,373
Reply to Office Action of January 3, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A network having a plurality of nodes running services that collaborate to provide a distributed environment for one or more applications, comprising:

a master node within said plurality of nodes, said master node including a primary server to run a centralized system service comprising a cluster membership monitor running to manage membership of a set of the plurality of nodes in a cluster;

a vice node within the plurality of nodes, the vice node including a secondary server to run the centralized system service when the master node is unable or unavailable to run the centralized system service; and

a system services coordinator on each of said plurality of nodes in the cluster to coordinate a function defining an operational transition in the cluster and regarding said centralized system service;

wherein said centralized system service registers callback actions with said system services coordinator and wherein said system services coordinator processes the registered callback actions for said centralized system service as part of the function coordinated by the system services coordinator and wherein the registered callback actions have levels, correlating to stages of completion of the callback action, that are tunable by the systems services coordinator.

2. (canceled)

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3. (original) The network of claim 1, wherein said master node communicates via a carrier grade transport protocol.
4. (canceled)
5. (original) The network of claim 1, wherein said function is an initialization function.
6. (original) The network of claim 1, wherein said function comprises a shut down function.
7. (original) The network of claim 1, wherein said function comprising a promote function.
8. (original) The network of claim 1, wherein said function comprises a demote function.
9. (original) The network of claim 1, wherein said function comprises a disqualify function.
10. (original) The network of claim 1, wherein said function comprising a qualify function.
11. (original) The network of claim 1, wherein said plurality of nodes includes a master-eligible node.
12. (canceled)
13. (canceled)
14. (Currently Amended) A node within a network of nodes for exchanging information, comprising:
a centralized system service to run on a primary server on the node, the centralized system service comprising a mechanism for monitoring membership

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of a set of the network nodes in a cluster providing a distributed application environment;

a system services coordinator to coordinate a transitional function regarding said centralized system service; and

a high availability level and an operating system level, wherein said system service coordinator resides in said high availability level and wherein said centralized system service at least partially resides in the operating system level;

wherein said transitional function includes a callback sequence used by the system services coordinator in performance of the transitional function including transition to an appropriate availability state, wherein said callback sequence includes levels correlating to stages of completion of the callback sequences, that are tunable by the systems services coordinator.

15. (canceled)

16. (original) The node of claim 14, wherein said centralized system service comprises a naming service.

17. (original) The node of claim 14, wherein said centralized system service comprises a component role assignment manager.

18. (original) The node of claim 14, wherein said centralized system service communicates via a carrier grade transport protocol.

19. (canceled)

20. (canceled)

21. (original) The node of claim 14, wherein said function comprises an initialization function.

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22. (original) The node of claim 14, wherein said function comprises a shut down function.

23. (original) The node of claim 14, wherein said function comprises a promote function.

24. (original) The node of claim 14, wherein said function comprises a demote function.

25. (original) The node of claim 14, wherein said function comprises a disqualify function.

26. (original) The node of claim 14, wherein said function comprises a qualify function.

27. (canceled)

28. (canceled)

29. (canceled)

30. (canceled)

31. (Currently Amended) A method for coordinating a system service within a network having a plurality of nodes, the system service comprising a cluster membership monitor for managing a cluster including a set of the plurality of nodes, comprising:

receiving a request at a system services coordinator on a master node, said system services coordinator having a component at each of said plurality of nodes in the cluster;

registering a callback sequence with said system services coordinator;

using said callback sequence for performing a function at one of said plurality of nodes in response to said request, wherein said using includes

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invoking callback functions having levels, said levels correlating to completing stages of said callback functions and levels being tunable by the systems services coordinator;

reacting to said function by said system services coordinator on said node and communicating a reaction to said system services coordinator; and

receiving said levels at said system services coordinator as said stages are completed.

32. (canceled)

33. (canceled)

34. (canceled)

35. (canceled)

36. (original) The method of claim 31, further comprising transitioning said system services according to said callback sequence.

37. (original) The method of claim 31, further comprising interfacing said system services with said plurality of nodes.

38. (previously presented) The method of claim 31 further comprising: determining levels of said callback sequence, said levels correlating to stages of completing said function;

receiving said levels at said system services coordinator; and

publishing events from said node by said system services coordinator correlating to said received levels.

39. (previously presented) The method of claim 38, further comprising communicating said levels to said system services coordinator.

40. (canceled)

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41. (previously presented) The method of claim 31, further comprising initializing a node in the cluster, the initializing comprising:

registering said system service on said node with one of the components of the system services coordinator;

triggering an initialization function having levels; and

receiving notification at said system services coordinator on the master node for completing said levels.

42. (original) The method of claim 41, further comprising retrieving boot parameters for said node.

43. (original) The method of claim 41, further comprising starting up an operating system on said node.

44. (original) The method of claim 41, further comprising loading a configuration table of said network.

45. (original) The method of claim 41, further comprising participating in formation protocol for said network by sending information about said node.

46. (original) The method of claim 41, further comprising initializing non-centralized system services on said node by registering said non-centralized system services with said system services coordinator.

47. (Currently Amended) A method for coordinating initialization in a network having a plurality of nodes, comprising:

registering centralized system services within said network with a system services coordinator;

electing a master node within said network and sending information on said master node to said plurality of nodes;

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using callbacks registered at said system services coordinator to trigger initialization levels at said plurality of nodes; and

informing said plurality of nodes when said master node completes said initialization levels via said system services coordinator wherein said initialization levels correlating are tunable by the systems services coordinator.

48. (original) The method of claim 47, further comprising registering said system services coordinator with a membership monitor within said network.

49. (original) The method of claim 48, wherein said electing includes claiming said master node by said membership monitor.

50. (original) The method of claim 47, further comprising reading a configuration table of said network.

51. (original) The method of claim 47, further comprising electing a vice node within said network.

52. (previously presented) The method of claim 31, further comprising switching over the master node having primary servers for the centralized system services comprising:

informing the system services coordinator on said master node of a loss of master eligibility on said master node;

invoking switchover callbacks registered at said system services coordinator; and

transferring states of said primary servers to secondary servers for said centralized system services at a vice node.

53. (original) The method of claim 52, further comprising updating said plurality of nodes on said transferred states via said system services coordinator.

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54. (original) The method of claim 52, further comprising updating non-centralized system services via said system services coordinator.

55. (original) The method of claim 52, further comprising triggering a switchover condition on said master node.

56. (previously presented) The method of claim 31, further comprising failing the master node having primary servers for the centralized system services, the failing comprising:

claiming mastership of said network at a vice node and informing said centralized system services via the system services coordinator; and

recovering states of said primary servers on said master node to secondary servers of said centralized system services on said vice node.

57. (original) The method of claim 56, further comprising detecting that said primary servers have been transferred.

58. (original) The method of claim 56, further comprising synchronizing a reconnection to said centralized system services at said plurality of nodes via said system services coordinator.

59. (original) The method of claim 56, further comprising detecting a failover condition at said master node.

60. (original) The method of claim 56, further comprising electing another vice node.

61. (previously presented) The method of claim 31, further comprising demoting a master eligible node among the set of the nodes in the cluster within the network, the demoting comprising:

initiating a demote callback sequence from the system services coordinator;

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transitioning centralized system services servers on said master-eligible node to a spare state; and

updating said system services coordinator.

62. (previously presented) The method of claim 61, further comprising triggering a switchover on said master-eligible node.

63. (previously presented) The method of claim 61, further comprising detecting a failover condition on said master-eligible node.

64. (previously presented) The method of claim 61, further comprising notifying said system services coordinator that said master-eligible node is to be demoted.

65. (previously presented) The method of claim 31, further comprising promoting a node in the set of the nodes in the cluster to be master eligible, the promoting comprising:

initiating a promote callback sequence from the system services coordinator;

transitioning centralized system services servers on said promoted node to an availability state, and

updating said system services coordinator.

66. (previously presented) The method of claim 65, further comprising notifying said system services coordinator that said promoted node is to be promoted.

67. (previously presented) The method of claim 31, further comprising disqualifying a node in the cluster from being master eligible within a network for exchanging information, the disqualifying comprising:

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initiating a disqualify callback sequence from the system services coordinator;

setting a master eligible attribute at said disqualified node; and

transitioning centralized system servers on said disqualified node to an offline state.

68. (previously presented) The method of claim 67, further comprising notifying said system services coordinator that said disqualified node is to be disqualified.

69. (previously presented) The method of claim 31, further comprising qualifying a node in the cluster to be master eligible, the qualifying comprising:

initiating a qualify callback sequence from the system services coordinator;

setting a master eligible attribute at said qualified node; and

transitioning centralized system servers on said qualified node to a spare state.

70. (previously presented) The method of claim 69, further comprising notifying said system services coordinator that said qualified node is to be promoted.

71. (previously presented) The method of claim 31, further comprising shutting down a node in the cluster, the shutting down comprising:

invoking callbacks of centralized system services on said shutdown node by the system services coordinator;

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requesting said shutdown node be removed from said network by said system services coordinator; and terminating said system services coordinator.

72. (previously presented) The method of claim 71, further comprising terminating said centralized system services when all callbacks are received at said system services coordinator.

73. (previously presented) The method of claim 71, further comprising shutting down said operating system at said shutdown node.

74. (previously presented) The method of claim 71, wherein said shutdown node is the master node within said network.

75. (previously presented) The method of claim 74, further comprising initiating a switchover on said master node.

76. (previously presented) The method of claim 71, wherein said shutdown node is a vice node within said network.

77. (previously presented) The method of claim 76, further comprising initializing another vice node.

78. (previously presented) The method of claim 71, further comprising rebooting said shutdown node.

79. (previously presented) The method of claim 31, further comprising removing a node from the cluster, the removing comprising:

initiating a shutdown callback sequence from the system services coordinator, wherein said shutdown callback sequence includes levels;

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notifying said system services as said levels are completed and terminating centralized system services on said removed node; and terminating said system service coordinator.

80. (previously presented) The method of claim 79, further comprising requesting said removed node be deleted from said cluster.

Claims 81-95 (canceled)